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APPROVED OIL SERVICES
CONCEPTUAL REMEDIATION APPROACH
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1.0 CONCEPTUAL MODEL AOS SOILS AND GROUNDWATER

1.1 SOILS

1) Soils in and around the tank excavation area are potentially the most impacted and present the greatest risk at the site:
   - In a 1992 investigation, soil in NW corner UST tank area at depths of 14 to 16 ft contained elevated TPH and VOC concentrations;
   - Soils removed from tank excavation were segregated into three stock piles based on degree of visual impacts; and
   - High detection limits for the stockpiled soils analyses in 1999 failed to adequately quantify VOCs and SVOC concentrations.
2) A portion of the soils in the base of the tank excavation area appeared to be impacted based on observations during the tank removal and the presence of LNAPL in groundwater;
3) Shallow soils adjacent to UST sump manholes may be impacted from historical use or overflows in this area;
4) Surface soils beneath the process area may be impacted at select locations; and
5) Soils in tank farm areas are potentially not impacted based on visual inspection of tanks and soils during AST removal.

1.2 GROUNDWATER AND LNAPLS

1) The combination of active groundwater remediation in 1997 and natural attenuation has significantly reduced the dissolved-phase plume, such that active remediation of a dissolved-phase plume is not needed at this site:
   - Chlorinated compounds, total organic halogens (TOX) and BTEX were elevated in well adjacent to site in June 1990;
   - Dissolved-phase organic impacts are minimal based on EPA Start Contractor sampling results reported in March 2000 (Samples collected July 1999);
   - No pesticides, PCBs or dioxins detected in groundwater in July 1999;

- Four wells adjacent to and downgradient of the AOS property were below MCLs for TCE (5 µg/L), Benzene (5 µg /L), PCE (5 µg /L), and cis1,2-DCE (70 µg /L) in July 1999;
- One well was slightly above MCLs for vinyl chloride at 3 µg /L in July 1999; and
- The bakery piezometer contained elevated TCE (18 µg /L) and cis1,2-DCE (150 µg/L) in July 1999; source of these constituents is unknown, but may be from a source unrelated to the AOS site.

2) LNAPL does not appear to be a major source of dissolved-phase constituents for groundwater:
   - EPA Start Contractor indicated that wells MA-MW-06 and MA-MW-07 contained approximately 2-inches of LNAPL in 1999; and
   - VOC and SVOC analyses for these wells were nondetect or below MCLs for all constituents, with the exception of vinyl chloride in well MA-MW-07 (3 µg /L); wells MA-MW-07 and MA-MW-05 contained 25 and 21 µg /L, respectively of 1,1-DCA (1,1-DCA does not have a MCL).

3) Subsurface LNAPL is restricted to the area of the tank excavation; the LNAPL volume appears to be relatively small; and significant LNAPL recovery is not technically feasible:
   - Only two wells adjacent to property contained a thin layer (2 inches) of LNAPL;
   - Previous LNAPL collection attempts by Milt Adams resulted in the recovery of approximately 20 gallons;
   - LNAPLs are approaching residual saturation in the alluvial deposits as evidenced by limited measurable thickness in wells and limited recovery; and
   - The LNAPL exhibits high viscosity and waxy properties that will act to limit recovery volumes.

2.0 REMEDIATION APPROACH

The general approach to remediation of the AOS site is to remove existing structures and tanks, ex-situ remediation and/or off-site disposal of impacted soils, and LNAPL source reduction. The following bulleted items summarize the proposed site remediation activities and approach.

2.1 DEMOLITION AND REMOVAL OF EXISTING STRUCTURES/TANKS:

Liquid/Sludge Removal and Off-Site Disposal

One of the first priorities for the site remediation will be the removal and disposal of liquids/sludges in ASTs and USTs. The following is an estimate of tanks and liquid contents:

1) Brown AST: approximately ¾ full (7,000 gallons) with oil/water and sludge mixture;
2) Blue AST: approximately ¼ full (4,000 gallons), with oil/water and sludge mixture;
3) Black AST: about ¼ full (150 gallons) of oily liquid;
4) Two UST Sumps: full (16,000 gallons) with oil/water mixture;
5) Four plastic AST tanks in process area: partially filled with an estimated 500 gallons of oil/water mixture pumped from sumps in May 2001;
6) Brown and blue pressure vessel adjacent to blue tank: Contents uncertain (assumed volume of 1,000 gallons); and
7) Cleaning fluids from tank, process equipment and concrete pad will be generated (estimated at 1,000 gallons).

Tank Disposal

1) Brown AST (10,000 gallons), Blue AST (12,000 gallons), Black AST (500 gallons), Brown Pressure Tank (4,000 gallons), Blue Pressure Tank (500 gallons): Clean and scrap tanks/vessels;
2) 6,000 and 10,000 gallons USTs sumps: Excavate and remove tanks; Clean and scrap tanks;
3) Two 8,000 gallons USTs (sulfuric acid and sodium hydroxide tanks) abandoned by filling with pea gravel in 1995: Excavate to expose tanks; cut top of tank to expose pea gravel; remove and stock-pile pea gravel for future backfill use; Clean and scrap tanks; and
4) Three or four plastic AST mixing tubs (500 gallons each?): Clean and dispose of tanks.

Buildings and Process Equipment:

1) Asbestos Survey: Perform an asbestos survey of process area; Process pipes, vessels and translucent corrugated roof panels may contain potentially asbestos-containing material (PACM); Removal and off-site disposal of PACM;
2) Two Process Buildings and Two Covered Areas: Demolish and dispose off-site (main office building will remain intact);

3) Process Area Pads: Steam clean concrete pads (where visually stained) and dispose off site;
4) Process equipment: Demolish and dispose off site; and
5) Underground Process Piping: All exposed underground pipelines will be drained, cleaned and dispose off site.

<u>AST Tank Farm Cement Retainage Areas</u>

1) Concrete floor in tank farm areas will be cracked (to prevent water ponding);
2) Concrete walls will be pushed in and used as fill material; and
3) Depressions will be backfilled with clean imported fill.

<u>Site Grading</u>

1) Approximately 4 to 6-inches of clean fill material will be placed over existing site soils to serve as an additional physical barrier to any residual soil impacts; and
2) Final site grade will be consistent with surrounding properties, land surface topography and drainage.

2.2 SOILS CHARACTERIZATION AND REMEDIATION:

<u>Stock-Piled Soils</u>

The goal for the stock-piled soil remediation is to obtain total petroleum hydrocarbon (TPH) concentrations of 500 mg/Kg or less for clean closure of the site and unrestricted future use of the property;

1) Backhoe cut for visual inspection and sampling;
2) Collect two composite confirmation samples from each of the three soil piles for synthetic precipitation leaching procedure (SPLP) testing; Perform VOCs and SVOCs analyses of the leachate;
3) Perform a risk analysis of stock-piled soils based on SPLP results; Depending on risk analysis results, soils will either be used for backfilling tank excavations, slightly impacted soils will be remediated ex-situ before placement as backfill and highly impacted soils will be shipped off-site for disposal;
4) If backhoe inspection and/or SPLP analysis indicate unacceptable risks associated with select soils, segregate soils for on-site ex-situ aeration in former AST containment area or off-site disposal; and
5) Shallow surface soils beneath stockpiles will be sampled to develop risk data.

<u>Existing UST Excavation Area</u>

1) Excavate visually stained soils on sides of excavation and stock pile for off-site disposal;
2) Extend excavation to water table, approximately 8 to 10 feet;
3) Segregate LNAPL impacted soils based on visual staining and/or head-space PID concentrations;
4) NAPL saturated soils will be stock piled for off-site disposal;

5) Less impacted soils will be stock piled for ex-situ treatment (if necessary) and backfilling;
6) Intermediate impacted soils will be spread in concrete tank containment areas for ex-situ aeration;
7) SPLP composites will be collected and analyzed for VOCs and SVOCs after a period of approximately 2 to 4 weeks; and
8) If SPLP samples indicate that the excavated soil is within acceptable risks, use as backfill in tank excavation area.

Eastern Ditch Soils

1) Collect subsurface soil samples on approximately 20-foot centers along the ditch to establish impact depths and to collect head-space PID measurements;
2) Excavate impacted soils and stock-pile for ex-situ remediation or off-site disposal;
3) Less-impacted soils will be analyzed to determine potential risk, then if appropriate, placed back in excavation; and
4) The remainder of excavation will be backfilled with clean imported material, then graded.

Sump Tank Soils

1) Excavate visually impacted soils in surface depression overflow area and stock pile for ex-situ remediation or off-site disposal; and
2) After confirmation samples indicate acceptable conditions, backfill excavation with clean fill.

Process Area Soils

1) Excavate visually stained soils and stock pile for off-site disposal;
2) Confirmation sampling of surface soils beneath cement pads, AST tanks and associated equipment; and
3) Risk assessment analysis will be performed on soils with elevated concentrations to determine if they can be left in place, remediated with ex-situ aeration, or shipped off site for disposal.

Tank Farm Surface Soils

1) Collect and analyze confirmation samples of surface soils; and
2) Excavate highly impacted soils for determination of suitability for ex-situ remediation/backfill; if unsuitable, dispose off site.

2.3 LNAPL Source Reduction

1) Removal of LNAPL soils from the base of the tank excavation will significantly reduce LNAPL source;
2) LNAPLs on the groundwater surface will be sorbed using booms; the excavation will be left open for about 1 week to facilitate LNAPL collection; and
3) All recovered LNAPL will be disposed off site.

2.4 GROUNDWATER DISSOLVED-PHASE PLUME REMEDIATION

1) Collect one round of groundwater samples in 5 wells immediately downgradient of the AOS property and one upgradient well to verify EPA Start Contractors results in 1999;
2) Collect groundwater samples from two hydropunch locations northwest and downgradient of the site;
3) No active groundwater remediation anticipated based on EPA Start Contractor's results; and
4) If constituents of concern are present above maximum concentration limits (MCLs) or risk-based levels, monitored natural attenuation (MNA) will be used as a remediation alternative.